

What is claimed is:

1           1.       A method of synthesizing carbon nanotubes, comprising the steps of:  
2           introducing a catalyst in a reactor;  
3           supplying a reactant gas containing a carbon source gas over the catalyst;  
4           selectively and locally heating the catalyst in the reactor; and  
5           growing carbon nanotubes from the heated catalyst.

1           2.       The method of claim 1, wherein the catalyst is formed of a transition  
2           metal such as iron, nickel or cobalt; metal sulfide, metal carbide, metal oxide or  
3           metal salt of the transition metal; or an organic compound containing the transition  
4           metal.

1           3.       The method of claim 1, wherein the catalyst is loaded on a support by  
2           an impregnation method, an incipient wetness method or an ion-exchange method  
3           and is supplied into the reactor in a powder state.

1           4.       The method of claim 1, wherein the catalyst is loaded on a substrate  
2           by a deposition method, a painting method and a spray method to be supplied into  
3           the reactor.

1           5.       The method of claim 1, wherein for the catalyst, a metal precursor is  
2           loaded on a substrate or a support and changed into a metal phase through  
3           reduction, calcination, sulfiding or carbonization, and the metal catalyst is supplied  
4           into the reactor.

1           6.       The method of claim 1, wherein for the catalyst, metal sulfide obtained  
2           by sulfiding a metal precursor with hydrogen sulfide is used.

1           7.       The method of claim 1, wherein the catalyst is supplied into the reactor  
2           in the form of a catalyst precursor in gas phase.

1           8.     The method of claim 7, wherein the catalyst precursor is ferrocene or  
2     iron pentacarbonyl.

1           9.     The method of claim 1, wherein the carbon source gas contains one  
2     selected from the group consisting of acetylene, methane, propane and benzene.

1           10.    The method of claim 1, wherein the reactant gas further comprises  
2     hydrogen gas or inert gas.

1           11.    The method of claim 1, wherein the reactant gas further comprises  
2     hydrogen sulfide (H<sub>2</sub>S) gas.

1           12.    The method of claim 1, wherein the local heating of the catalyst is  
2     performed by irradiation of microwaves.

1           13.    The method of claim 1, wherein the local heating of the catalyst is  
2     performed by electromagnetic inductive heating.

1           14.    The method of claim 1, wherein the local heating of the catalyst is  
2     performed by laser heating.

1           15.    The method of claim 1, wherein the local heating of the catalyst is  
2     performed by radio frequency heating.

1           16.    An apparatus for synthesizing carbon nanotubes, comprising:  
2     a reactor for receiving a catalyst;  
3     a reactant gas supplier for supplying a carbon source gas into the reactor;  
4     and  
5     a local heater for selectively heating the catalyst received in the reactor.